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Children Walking to and from School in Tehran: Associations with Neighbourhood Safety, Parental Concerns and Children's Perceptions

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Abstract

In recent times children are more likely to use motorized transportation modes to go to and from school. This paper focuses on examining the relationship between neighbourhood safety and primary-aged children walking to and from school on their own; across different socio-economic areas in Tehran. Self-reported parental and children surveys and urban design measurements were used to determine the influential neighbourhood safety factors in choosing children's school transportation mode. The results reveal that parents and children with negative perceptions of neighbourhood safety tended to use motor vehicles or to escort their children while walking to and from school.

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1. Introduction

There is general agreement that physical activities are necessary for children's health and their walking to and from school can be a source of daily physical activity. During the past decades, walking to and

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from school independently was a normal practice in most parts of the world (Ahlport, 2008). However, in recent times parents are often reluctant to allow their children to walk to school on their own. They are concerned about traffic, road conditions and the lack of supervision. However, children's travel mode will affect their future travel behaviour as an adult, as researches show people stick to their habitual pattern of travel mode (McDonald, 2008). Therefore, children should be targeted to cultivate the habit of walking to and from school in them as it has been said: "Habits cultivated at an early age are hard to break" (McMillan, 2005). Moreover, children and the elderly are groups with a low limit of tolerance, which should be considered in the design of streets (Selberg, 1996). As such, considering children as pedestrian means changing the living conditions in the city shall starting with the layout of streets and traffic regulations. This includes improving the perception of personal safety in neighbourhoods.

1.1. Region of study

There are many attempts to improve traffic congestion and air pollution, as well as to promote healthy transportation modes both in developed and developing countries. Studies show that traffic congestion and air pollution will be worse in the future in developing countries due to the rapid growth of their population which increases the demand of mobility (Schafer, 1998; Afroz et al., 2003). This factor is likely to be prominent in any proposal in developing countries for making neighbourhoods safe and facilitated for pedestrians.

Tehran is the most populated city in Iran; with a population of 7,872,280 and it covers an area of 754 square meters (Tehran's Master Plan, 2006). Tehran is divided into 22 administrative regions that have been divided into three socio-economic areas (Tehran Master Plan, 2006). Over the last two decades, motor vehicles have emerged as a critical source of urban air pollution in this city (Faiz, 2000; Madanipur, 1999; Atash, 2007). In the last few years, the air pollution level has occasionally reached to such dangerous levels that Tehran officials had to close schools and impose traffic restrictions (Atash, 2007). Recently, city officials attempted to make some policies regarding primary-aged children's school transportation mode in order to reduce traffic jams and air pollution. However, the policies were made without a complete understanding of key factors which influence children's travel modes and as such, hit a low point.

2. Literature Review

Studies such as Smart Growth found that improving the built environment did not cause people to walk more, but they had not focused on any types of travel (i.e. leisure or work) or any population category. However, it did indicate that there are some other influential factors on travel behavior (Handy et al., 2002; Falb et al., 2007; Fyhri et al., 2009). Donald Appleyard's work also showed that pedestrian activity is associated with the level of personal safety within a neighbourhood (Appleyard, 2003).

Later in 1997, Safe Routes to School (SR2S) programs, aimed at making the school journey safer and healthier for children. This program assumes a direct relationship between improving the built environment and increasing the number of children walking to and from school. However, the evaluation of SR2S showed lack of personal safety in a neighbourhood may decrease a child's walking to and from school (Corsi, 2002; Boarnet et al., 2005). Moreover, other studies have showed that for primary school-aged children, physical environmental factors are less important than social factors; parents are more worried about their children being abducted rather than being physically injured (Granville et al., 2002; Yeung et al., 2008; McNeill et al., 2006). From the aforementioned personal safety issues are prime concerns for parents in choosing children's travel mode (Merom et al., 2006; McDonald, 2007; Schlossberg et al., 2006; Hume et al., 2009; Wendel et al., 2009). Studies showed parents' comfort level

for allowing children to walk to school on their own may be affected by elements of urban design that relate to safety, but rarely went deeper to recognize the specific physical elements which represent neighbourhood safety (Mc Millan, 2003). Studies also showed the actual level of crime in a neighbourhood is not as is perceived by people. Therefore, to achieve a good result, it is necessary to identify physical elements which are related to the neighbourhood safety, as well as parental and children's perception of safety.

The question of what the environmental barriers are for children in their walking to and from school independently, is often complex. However, few studies focused on children's perception of the barriers for them in their walking to and from school. More importantly, limited studies explained the perception of neighbourhood safety factors across different socio-economic status areas (Pan, 2009; Hamed, 2000).

2.1. Aim of study

This study tries to explore the association between parental and children's perception of personal safety in the neighbourhood with the likelihood of a child's walking to and from school. It further attempts to find out if parents' and children's perceptions of environmental barriers vary across different socio-economic areas.

3. Methodology

A cross-sectional survey of parents and children was used to examine data from 18 school sites in Tehran within three different income groups. Qualitative and quantitative data (open-ended and structured questions in questionnaire) were collected at the same time and all data was transformed into numbers for analyzing, to be able to compare with quantitative results in the discussion section of the study (Creswell, 2003). All data was analyzed using the statistical program, SPSS-version 17 for Windows.

Cross-tabulation was prepared to show the relationship between independent and dependent variables to examine the environmental barriers for children in their walking to and from school on their own. Further significant test (correlation-coefficient) was used to show the strength of the relationships. Finally, ANOVA test was used to determine whether there is any difference between barriers across the areas. Variables were selected from existing literature and parental and children's surveys.

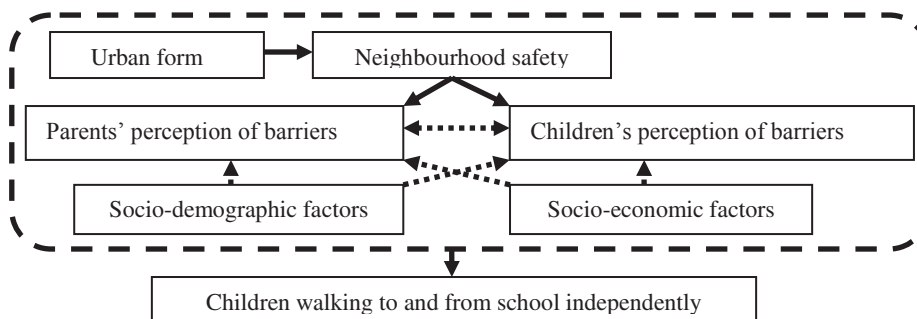


Fig.1. The conceptual framework shows the relationships between neighbourhood safety and travel pattern

The above conceptual framework draws a conclusion to explore the relationship between neighbourhood safety and children walking to and from school. The framework suggests that several factors impact on how a trip to and from school is made. It shows that socio-economic and socio-demographic factors affect parents' and children's perception of safety which also means their perception of barriers may vary across different areas. It colludes that, although all the factors are not directly related

to children walking to and from school; these factors will assist in developing more comprehensive policies.

3.1. Research sites

The study focused on primary government schools in Tehran, because of their neighbourhood orientation, and the tendency of all existing policies to work with this age group of children. School catchment areas were stratified into rich, middle and low socio-economic statuses (see Figure 2 (a)). A multi-stage cluster sampling of schools was arranged, based on a complete list of all primary schools in different areas (see Figure 2 (b)) (D.A.de Vaus, 2002). Three districts were excluded from the sampling because the student population was small in these areas. The third one was not under the supervision of the Department of Education and Training in Tehran (District Number 20, 21, 22). Children in Iran go to separate schools in terms of gender from primary till the end of high school. Therefore, two schools were selected from each district, one male and one female, to be fair in gender terms.

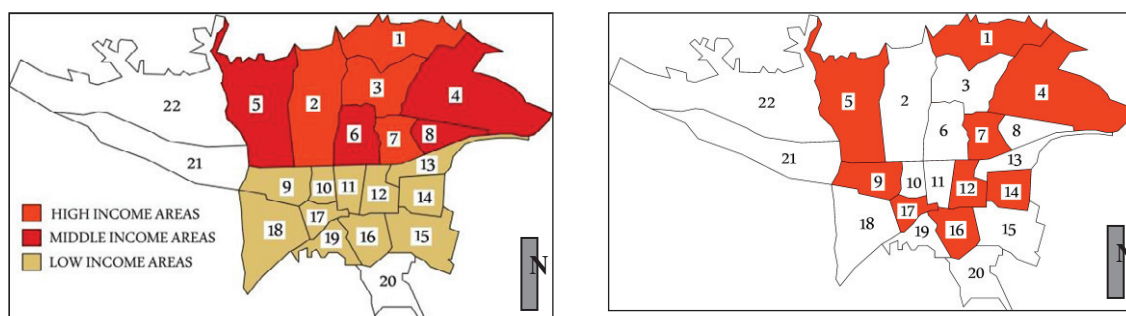


Fig.2. (a) First map shows different socio-economic areas in Tehran; (b) second map shows school catchment areas

3.2. Data collection procedure

Data collection was conducted during January and February of 2009. Multiple methods of data collection were used to strengthen reliability as well as internal validity (Merriam, 1988, Tashakkori & Teddlie, 2003, Creswell, 2003). Data collection included parental survey, children's writing activities and some unstructured interviews with them to understand better what they mean.

3.3. Parental survey

The parental survey was designed to extract their perception of barriers in children walking to and from school. Parents' surveys were distributed to children, in grades 3-5, at the selected schools to take home to their parents for their completion. The parents then returned the completed survey to school via their children the following day. An overall survey response was 56%, and no follow-up was taken to capture non-respondents. The survey included both open-ended and close-ended questions in order to clarify the results of the parental survey (Crump, 2008). In addition, telephone interviews were conducted with parents who did not answer the open-ended questions completely because the researcher did not have direct access to individuals (Creswell, 2007). The questionnaires had different sections including general information, parents' work travel mode, parents' feeling and decision about their children's travel to and from school, parents' school travel mode and parent's perception of safety in the immediate school environment.

3.4. Children's survey

Children of all three age groups were invited to participate in the survey, including children who walked to and from school and those who did not. After explaining the purpose of the study to them, volunteer students were asked to fill up a simple chart showing environmental factors that prevented them from walking to and from school on their own. They were further asked to write a composition about their journey to and from school and some of them were interviewed later on to clarify and understand what the children meant (Creswell, 2007; Yin, 2003). Using a writing method for collecting data from children helped the researcher to obtain data more quickly and from a greater number of children (Boyden & Ennew, 1997; Cameron, 2005; Sinclair, 2004). Some questions were asked of both parents and children, enabling a linkage between the answers of the children and those of their parents.

4. Results and Discussion

There were almost equal male and female children in the sample to be fair in gender (51.2% female, 48.8% male). Children were also distributed equally across different grades. According to previous research, the most important barrier for children in their walking to and from school is the distance from home to school (Granville et al., 2002; McMillan, 2003). In this study the majority of the children lived less than 1 km from school, however, only a few students walked to school, especially on their own.

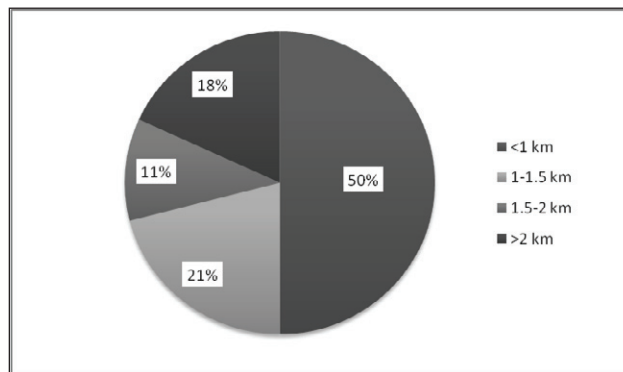


Fig.3. Parents' report about child's travel distance from home to school

To understand if any factors in the environment impede children's walking to and from school, we need to know both their current and favourite travel mode to school. Also, we should know the reasons if they cannot meet their desirable school transportation. When parents and children were asked about how the children usually go to school, about 42 % mentioned walking as a main school travel mode. However, more than 20 % of children walked with their parents or older siblings. Most importantly, there were some differences between a child's transportation mode to and from school, the result was summarized in Table 1.

Walking was still the predominant travel mode in the afternoon (back home from school). Children were more likely to walk with their friends on their trip back home from school. Few students used public transportation and nobody chose cycling or skating to and from school, so these were excluded from further analysis. This may be explained by poorly planned roads for cycling and skating, climate conditions during school time. It may also be due to cultural and social norms in Iran regarding biking

and skating on the streets, especially for girls. Being driven by parents had a higher rate among high-income groups, while low-income groups' students had the highest rate of walking to and from school.

Table 1. Respondents' report about child's current travel mode to and from school. Source: Author

Child's transportation modes	Child's current travel mode to school	Child's current travel mode from school
Walk with friends	5.6	19.4
Walk with parents	27.4	24.6
Walk with siblings	3.2	2
Walk alone	11.9	10.3
Driven by parents	20.2	8.7
By public transportation	3.6	4.4
By school bus	28.2	30.6

Parents and children were further asked about the most convenient transportation mode to school for their children. The majority of parents reported walking was the best school transportation mode for their children if they could escort them. Only a few of them thought that children walking with their friends, or on their own to school was a proper school travel mode. On the contrary, over 36% of the children reported they would like to walk to school with their friends, and the rate increased slightly on their return trip home from school. Approximately 43 % of parents reported lack of personal safety in the neighbourhood as the main reason why they preferred their children not to walk to and from school. To understand which neighbourhood safety elements were associated with a child's walking to school, cross-tabulation and correlation coefficient were done.

Variables relating to personal safety in a neighbourhood from parent's and children's surveys were included in the analysis. Children's school transportation modes were limited to walking with friends or alone, walking with an adult or elder sibling, being driven by parents and using the school bus. Four items focused on adult's supervision, general safety in the neighbourhood and the number of pedestrians on the street were factors which may have an influence on the parents' perception of safety for their children's walking to and from school. Two items focused on personal safety in the neighbourhood were factors that may have an effect on children's perception of safety in their walking to school.

Table 2 provides the correlation coefficients and significance levels for cross-tabulations between children's travel mode to school and their parents' perception of safety in the neighbourhood. The variables which are related to parental perception of safety in the neighbourhood were:

- If one of the parents or an adult whom they know walked with the child to school,
- If a lot of children walk to school together,
- If there are a lot of pedestrians on the street and
- Presence of safety in the neighbourhood.

Table 2. Indicate the different strength of association between a child's trip to school and parental perception of personal safety in the neighbourhood.

Child's transportation modes	if child being escorted by an adult	correlation	sig	if a lot of children walk to school	correlation	sig
Walk with friends	0.261	0.294	0.001	0	0.387	0.157
Walk with parents	0.921	0.877	0	0.103	0.24	0.82
Walk with siblings	0.75	0.42	0	0.286	0.349	0.515
Walk alone	0.111	0.298	0.009	0	0.345	0.587
Driven by parents	0.45	0.25	0.063	0.111	0.428	0.082
By school bus	0.277	0.252	0.048	0.2	0.343	0.302

Table 2. Continued

Child's transportation modes	if there were a lot of pedestrian on the street	correlation	sig	presence of safety in the neighbourhood	correlation	sig
Walk with friends	0.125	0.226	0.841	0.667	0.137	0.987
Walk with parents	0.132	0.245	0.511	0.696	0.205	0.31
Walk with siblings	0.286	0.282	0.738	0.571	0.305	0.186
Walk alone	0.5	0.285	0.674	0.571	0.21	0.79
Driven by parents	0.083	0.309	0.348	0.684	0.271	0.005
By school bus	0.192	0.357	0.041	0.588	0.148	0.942

The relationships between “parent/adult, who parent knows walks with the child” and children's walking to school (with friends, and parents) were very strong. The significance level of 0.000 indicated that this strong relationship was most likely to hold in the population rather than occurring due to sampling error. “Parent or an adult whom the parent knows walks with the child to school” had moderate association with a child's walking to school alone, with an elder sibling, being driven by parents and using school bus. All relationships reflected the population. It could be explained that only a few parents who sent their children to school by car or school bus would let their children walk to school if they could walk with them.

The relationship between children being driven by parents and “if a lot of children walk to school” was moderate, and the relationship was most likely to hold in population. It indicated that some of the parents who chauffeured their children to school would allow their children to walk to school, if a lot of children walked to school. “If there are a lot of pedestrians on the street” and sending a child to school by school bus, reflected a moderate relationship in population (sig=0.004). It showed that few parents whose children currently used the school bus would allow their child to walk to school if a number of people who walked on the street increased. The association between other children's school transportation and these variables neither was strong nor at the significance level of 0.000.

Children's perception of personal safety in the neighbourhood was limited to “I am scared of being abducted” and “I am scared of being abused by building workers”. However, there are no relationships between children's travel modes to school and those variables. It can be explained that parents were more likely to be final decision-makers about their children's travel mode to school, and children's perception of safety in the neighbourhood did not affect their decision.

To identify whether there is any difference between variables which represent parents' perception of personal safety in the neighbourhood and their children's travel mode to school, ANOVA test was used (see Table 3).

Table 3. ANOVA test of "children's walking with parents or an adult who the parents know of" by different socio-economic status areas

		Sum of Squares	df	Mean Square	F	Sig.
...you or an adult you knew could walk with him/her	Between Groups	1.411	2	0.706	0.5	0.605
	Within Groups	253.67	181	1.401		
...the neighbourhood was safer	Between Groups	2.682	2	1.341	0.78	0.462
	Within Groups	262.711	152	1.728		
...there were more people who walked in the neighbourhood	Between Groups	2.733	2	1.367	0.87	0.425
	Within Groups	123.069	78	1.578		
...other children walked together to/from school	Between Groups	0.698	2	0.349	0.29	0.749
	Within Groups	67.234	56	1.201		

The significance levels in ANOVA test indicated that there was no difference between parental perceptions of neighbourhood safety barriers across different socio-economic status areas in Tehran. Parents preferred to walk with their child to school rather than allowed them to walk on their own, and the number of pedestrians on the street (adult or children) did not affect significantly parental decision-making about their children's walking to school. Finally, the level of safety in the neighbourhood may increase the number of children who walked to school, but did not stop parents walking with their children to school. However, more studies are needed to find out how parental perception of personal safety could be improved, especially through the physical elements of the environment.

5. Conclusion

Several definitions and measures of social safety exist. The findings were consistent with results of other studies that showed that the most important dimension of social safety for children's trips to school was parental perception about personal and traffic safety in neighbourhoods (McNeill et al., 2006; Lochner et al., 1999). Moreover, children's feeling about personal safety in a neighbourhood did not change the relationships. The results also indicated, parents who had negative perceptions of neighbourhood safety had tended to use motorized modes more rather than walking with their children to and from school. It also revealed that low-income children had a higher rate of walking to and from school, because they would like to avoid travel costs. The findings highlighted although children's travel mode to school varied across different areas, parental perception of safety in the neighbourhood did not vary within different income groups. It can be explained that there are some other variables that affect parental decision-making about their children's trip to school besides neighbourhood safety.

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